Ontario

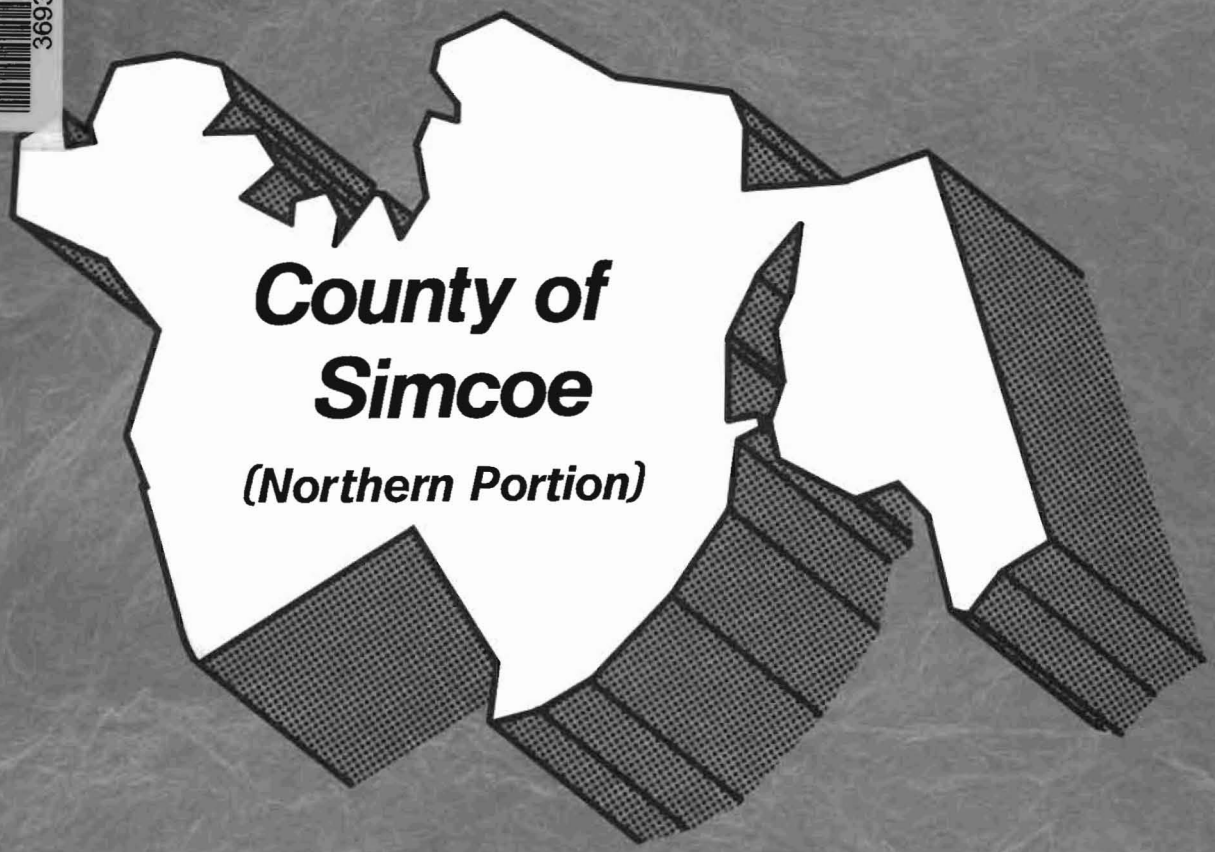
of the

Environment

Hon. Keith C. Norton, Q.C., *Minister*
Gérard J. M. Raymond, *Deputy Minister*

Water Resources Branch
Hydrology and Monitoring Section

Map 3126



County of Simcoe

(Northern Portion)

Ground Water Probability

by

M. E. Turner

1982

MAP 3126
COUNTY OF SIMCOE (NORTHERN PORTION)
1982

MAP 3126 – SHEET 1 – COUNTY OF SIMCOE (NORTHERN PORTION)
WATER SUPPLIES IN SHALLOW OVERBURDEN

Map 3126-1

YIELDS FROM SHALLOW OVERBURDEN

Scale 1 : 150 000

1 inch equals approximately 2.37 miles

2 1 0 2 4 6 8 10 Miles

2 1 0 2 4 6 8 10 12 Kilometres

LEGEND

- Area where wells are likely to yield less than 2 gallons per minute; difficulties are encountered in obtaining sufficient quantities of water for any purpose
- Area where wells are likely to yield 2 to 10 gallons per minute; supplies are generally adequate for domestic and livestock purposes
- Area where wells are likely to yield 10 to 50 gallons per minute; supplies are generally plentiful for domestic and livestock purposes and generally adequate for most commercial and small industrial purposes
- Area where wells are likely to yield more than 50 gallons per minute; supplies are generally adequate for most purposes
- Area with insufficient data for probable yields interpretation
- Drilled well
- Bored well
- 34 — Depth to water-bearing zone (in feet)
- 013 — Total depth of dry well (in feet); water might be obtained at greater depths
- 57117 / 30 — Ground-water sample location; sample or well number / Depth to top of water-bearing zone (in feet)
- ? — Depth unknown

NOTES:

1. Water-sample analyses are shown in Table 1, Sheet 4
2. Individual well yields may differ from yields indicated for an area
3. Only representative wells have been plotted in areas of high well densities
4. Both regional and geographic boundaries are depicted

MOE 2239

A COMPARISON OF DIFFERENT WELL TYPES AND THEIR APPLICATIONS

WELL TYPE	SUITABLE GEOLOGIC MATERIALS	ADVANTAGES	DISADVANTAGES
DUG WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Does not require special machinery to construct • Large diameter provides reservoir storage; augments low yields • Can be constructed in areas of limited access	• Labour intensive to construct • Depth is limited because of caving • Well failure is common during dry periods because of usually shallow depths
BORED WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Efficient method of constructing large-diameter wells • Large diameter provides reservoir storage; augments low yields	• Depth is usually limited because of well-drilling equipment limitations and very hard earth materials
DRILLED WELLS	OVERBURDEN AND BEDROCK moderate to high-yielding materials (sand, gravel, sandstone, limestone)	• Can reach deeper depths than other techniques • Can penetrate bedrock	• Generally small-diameter wells with little reservoir storage capacity
DRIVEN OR JETTED WELLS (Sand Points)	OVERBURDEN moderate to high-yielding materials (sand and gravel)	• Simple installation: can be done by hand or machine • A number of these wells can be hooked into one water-supply system	• Small diameter provides little reservoir storage • Depth is limited; depends on tightness of overburden

YIELDS FROM SHALLOW OVERBURDEN – SUMMARY

Shallow overburden wells yield less than two gallons per minute in most areas of the northern portion of the County of Simcoe. Areas of 2-10 gallons per minute are found mostly in areas of permeable, surficial sands and gravels of beach, shallow lacustrine, ice-contact and glacio-fluvial origins. Such areas are found along major bodies of water such as Nottawasaga Bay to the west, Thunder Bay to the northwest and Lake Simcoe and along rivers such as Hog Creek and Sturgeon River in the west-central portion of the map area and Coldwater River and Willow Creek in the central portion of the map area. Significant areas yielding 10 to 50 gallons per minute are restricted to raised beach deposits of glacial Lake Algonquin along Nottawasaga Bay in the west. Isolated pockets yielding 10 to 50 gallons per minute and over 50 gallons per minute are scattered in beach, ice-contact, and alluvial sands and gravels in the Midland area and along the west shore of Lake Couchiching.

Areas with insufficient data for yield interpretations are found in the northwest portion of the map area around Wye Lake at Midland, and on Christian, Beckwith, Hope and Giant's Tomb islands. Areas with very thin overburden are found in the northern and eastern portions of the map area.

SOURCES OF INFORMATION

Burwasser, G. J., 1974; Quaternary geology of the Collingwood-Nottawasaga area, southern Ontario; Division of Mines, Preliminary Map P.919, Geological Series.

Burwasser, G. J., and Boyd, S. T., 1974; Quaternary geology of the Orr Lake area (western half)—Nottawasaga area (eastern half), southern Ontario; Ontario Division of Mines, Preliminary Map P.975, Geological Series.

Burwasser, G. J., and Cairns, B. D., 1974; Quaternary geology of the Barrie area (western half), southern Ontario; Ontario Division of Mines, Preliminary Map, P.976, Geological Series.

Chapman, L. J., and Putnam, D. F., 1975; Physiography of the Georgian Bay-Ottawa Valley area; Ontario Ministry of Natural Resources, Ontario Research Foundation, Map 2228.

Deane, R. E., 1950; Pleistocene geology of the Lake Simcoe District, Ontario; Geological Survey of Canada, Memoir 256.

Turner, M. E., 1981; Ground-water probability of the southern portion of the County of Simcoe; Ontario Ministry of Environment, Water Resources Branch, Map 3135.

NOTE:
Geological information was derived from water-well records on file with the Ontario Ministry of Environment up to September, 1979.

Map compilation and interpretation by M. E. Turner, 1980.

Cartography by D. McQuillan.

Base maps derived from 1:50 000 map sheets of the National Topographic series.

METRIC CONVERSIONS

1 foot	=	0.305 metres
1 mile	=	1.609 kilometres
1 gallon	=	4.546 litres
1 gallon per minute	=	7.576×10^{-2} litres per second

Gallons per minute: 0 5 10 15 20 25 30 35 40 45 50

Litres per second: 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

MOE 2240

Map 3126-2

PERMEABILITY OF SURFICIAL MATERIALS

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

5 0 5 10 Miles

5 0 5 10 15 Kilometres

LEGEND

- 3 — Less permeable materials, clay, silt, till
- 2 — Permeable materials, sand and/or gravel
- 1 — Bedrock
- 3/1 — Bedrock overlain by thin layer of less permeable materials
- Swamp

DESCRIPTIVE NOTES

In this publication, ground-water availability on a regional scale is indicated in terms of probable quantities of water available, depths at which water is commonly found, and water quality at sampled locations. Because of the complexity of ground-water occurrence, the foregoing information is presented on four map sheets:

- Sheet 1: Supplies in Shallow Overburden
- Sheet 2: Supplies in Deep Overburden
- Sheet 3: Supplies in Bedrock
- Sheet 4: Water Quality

Hydrogeologic interpretations are based on data obtained from approximately 8,000 water-well records on file with the Ontario Ministry of the Environment and from past-documented studies of ground-water availability. The appropriate references are listed on each map sheet. Reliability of the interpretations varies throughout the region and a periodic up-dating or revision of the present interpretations may be necessary as new hydrogeologic information becomes available.

It is important to note that the interpreted probable well yields may not everywhere represent yields available to all wells because of variations in local hydrogeology, type of well construction, and in the reliability of available data. However, the indicated yields are thought to be good approximations in most areas. In cases where reliable, long-term yields are sought, it is necessary to undertake detailed hydrogeologic investigations and pumping tests.

ASSESSING WATER REQUIREMENTS

In order to evaluate well yields, the amount of water required from a prospective well should first be estimated. To estimate the approximate domestic and livestock daily water requirements, multiply the number of users (people and animals) by the appropriate figure in the table below. If desired, an additional 20 to 30% can be added to the total to account for increased demand in the future. While individual residential needs are difficult to estimate, most homes with water-consuming items such as washing machines will average about 100 gallons per day per person.

It is important to take into account the water demand during peak periods of usage in order that the well does not run dry temporarily. This demand can be estimated by counting the number of fixtures and water outlets in the house which will be used at one time, and multiplying by the flow rate for each. Tables showing the flow rate per fixture can be obtained from water-supply equipment dealers.

Approximate Daily Water Requirements

each member of the family (kitchen, laundry, bath)	50-150 gallons per day
for each producing milk cow (incl. washing)	35 gallons per day
for each dry cow	15 gallons per day
for each steer, horse	12 gallons per day
for each hog	4 gallons per day
for each sheep	2 gallons per day
for each 100 chickens	6 gallons per day
for each 100 turkeys	12 gallons per day

Note: – table modified from F. R. Hore, Farm Water Supply, Ontario Department of Agriculture and Food, Publication 476

For information on irrigation requirements, contact your Regional Office of the Ontario Ministry of Agriculture and Food.

EVALUATION OF PROSPECTIVE WELL SITES

By using the maps in this publication along with the following step-by-step procedure, prospective well sites can be evaluated in terms of probable yields, likely depths to water-bearing zones, and likely quality of water at each site. Subsequently, this information can be used in other considerations such as possible water treatment, pump type and size, well cost, and type of well construction (a table illustrating the different types of well construction and their applications is appended).

The maps should be used in the suggested sequence in order to obtain the most economic wells. Map 3126-1 indicates yields from the shallowest formations and should be consulted first. Progressively deeper and more costly wells will have to be constructed as water is sought from deeper formations in order to obtain the yields indicated on maps 3126-3 and 3126-5.

Evaluation Procedure

To evaluate yields:

1. locate the well site on Map 3126-1 of Sheet 1 (Yields from Shallow Overburden);
2. note the colour of the map at the well site;
3. refer to the legend and relate the colour to the appropriate probable yield;
4. if the probable yield does not meet your water requirements, repeat steps one through three using Map 3126-3 on Sheet 2 (Yields from Deep Overburden). Similarly, if probable yields determined from Map 3126-3 are insufficient, repeat the same steps using Map 3126-5 on Sheet 3 (Yields from Bedrock).

To evaluate the depths to water-bearing zones:

5. If Map 3126-1 was selected in the above steps, water-bearing zones occur at depths easily reached by shallow dug and bored wells and sand points; if Map 3126-3 was selected, locate the well site on Map 3126-4 and note the depth to the water-bearing zones by using the legend; if Map 3126-5 was selected, locate the well site on Map 3126-6 and note the depths to the water-bearing zones by using the legend;
6. exact depths to water-bearing zones for individual wells are shown on maps 3126-1, 3126-3 and 3126-5.

To evaluate water quality:

7. to evaluate the likely ground-water quality at a potential well site, locate the well on the selected yield map and note the nearby ground-water sampling points. Chemical analyses of these samples are found in the Inorganic Chemical Analyses (tables 1, 2 and 3) on Sheet 4. To interpret the significance of the analyses, refer to the 'Water Quality' section on Sheet 4.

Ontario
MINISTRY OF THE ENVIRONMENT
Water Resources Branch

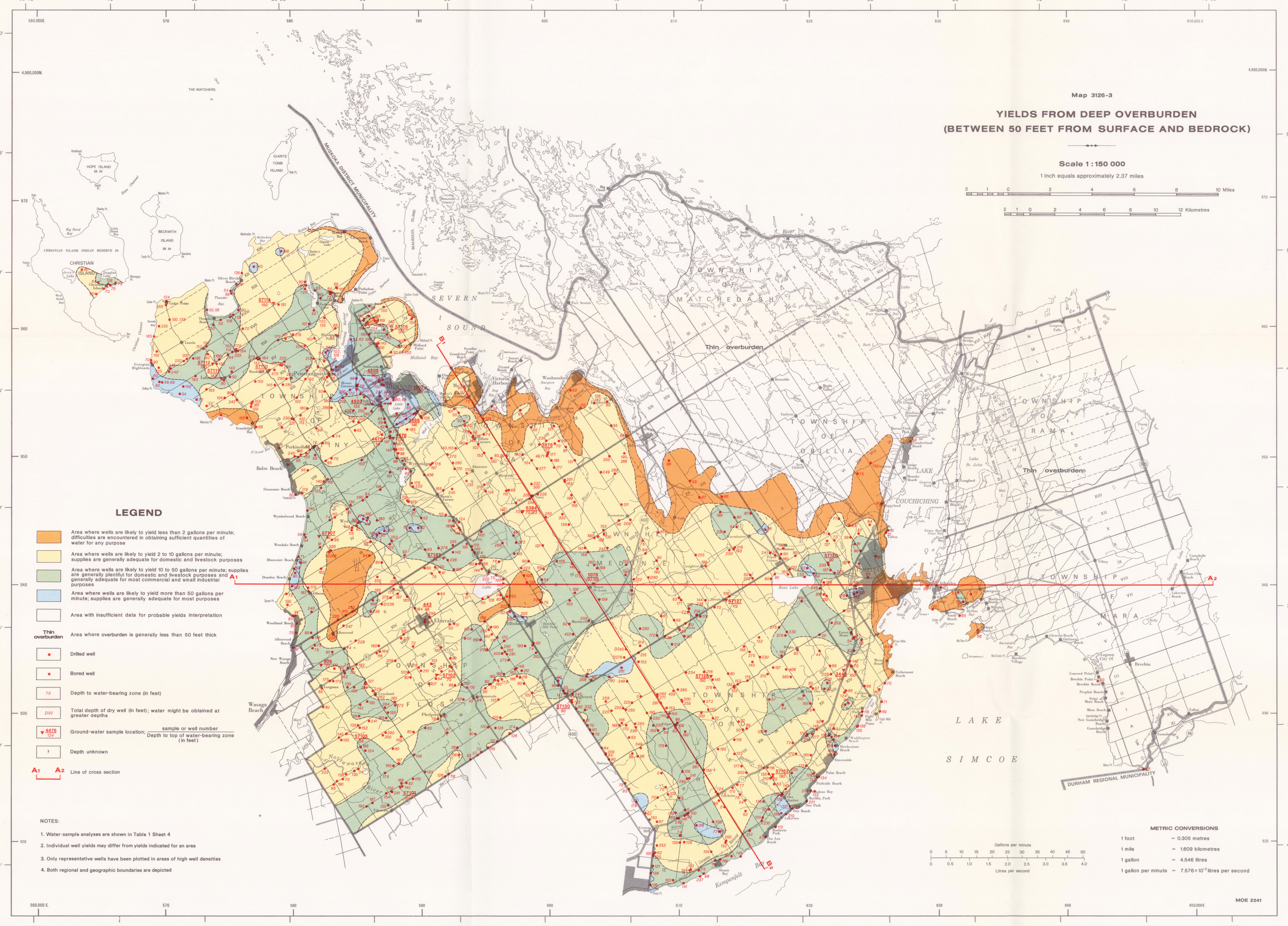
COUNTY OF SIMCOE
(Northern Portion)

Map 3126

GROUND-WATER PROBABILITY

SHEET 1

WATER SUPPLIES IN SHALLOW OVERBURDEN
(WITHIN 50 FEET OF SURFACE)



Map 3126-3

YIELDS FROM DEEP OVERBURDEN (BETWEEN 50 FEET FROM SURFACE AND BEDROCK)

Scale 1 : 150 000

1 inch equals approximately 2.37 miles

LEGEND

- Area where wells are likely to yield less than 2 gallons per minute; difficulties are encountered in obtaining sufficient quantities of water for any purpose
- Area where wells are likely to yield 2 to 10 gallons per minute; supplies are generally adequate for domestic and livestock purposes
- Area where wells are likely to yield 10 to 50 gallons per minute; supplies are generally plentiful for domestic and livestock purposes and generally adequate for most commercial and small industrial purposes
- Area where wells are likely to yield more than 50 gallons per minute; supplies are generally adequate for most purposes
- Area with insufficient data for probable yields interpretation
- Thin overburden — Area where overburden is generally less than 50 feet thick
- Drilled well
- Bored well
- 75 — Depth to water-bearing zone (in feet)
- D92 — Total depth of dry well (in feet); water might be obtained at greater depths
- 4476 / 124 — Ground-water sample location; sample or well number / Depth to top of water-bearing zone (in feet)
- ? — Depth unknown
- A1 A2 — Line of cross section

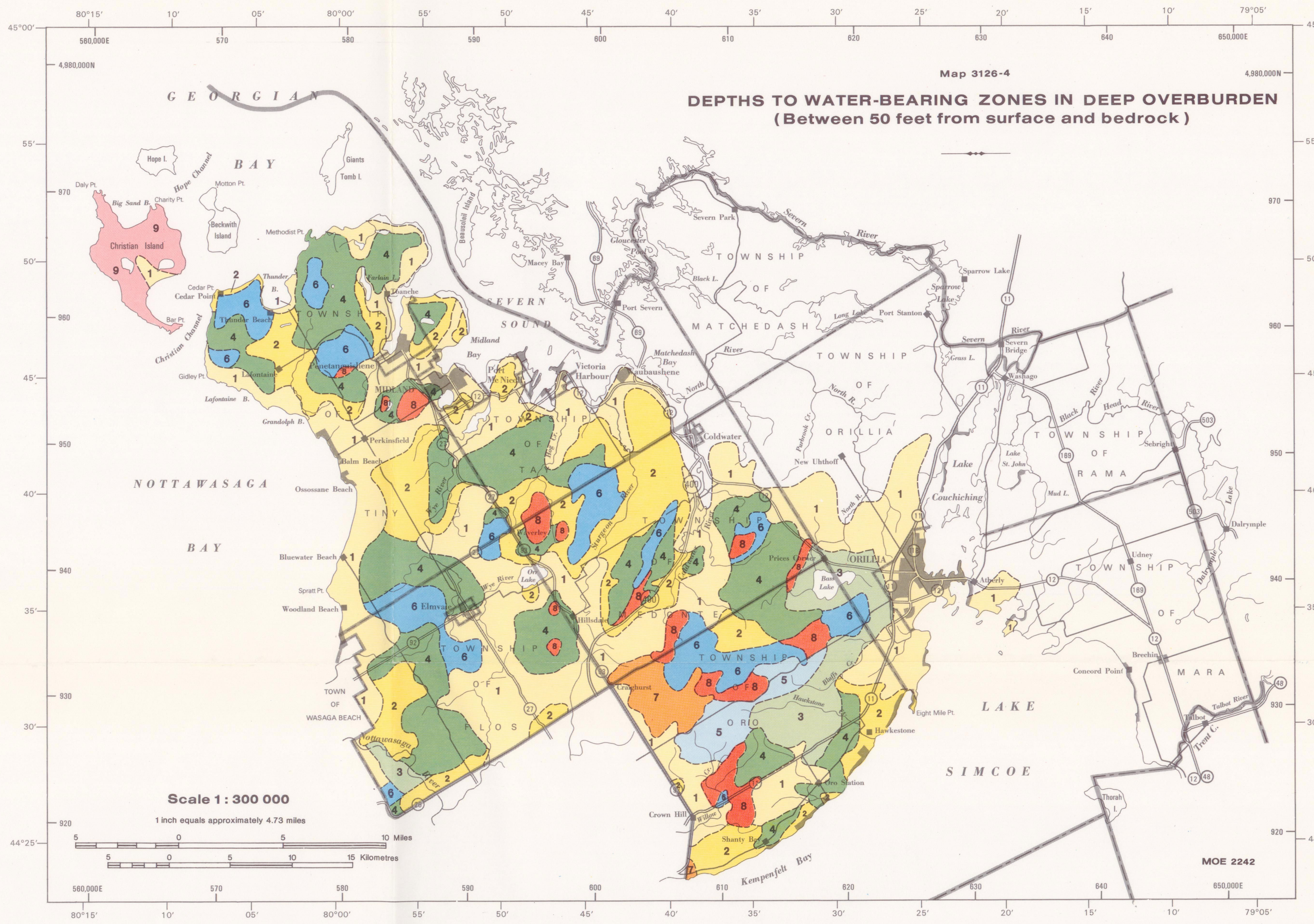
NOTES:

1. Water-sample analyses are shown in Table 1 Sheet 4
2. Individual well yields may differ from yields indicated for an area
3. Only representative wells have been plotted in areas of high well densities
4. Both regional and geographic boundaries are depicted

METRIC CONVERSIONS

1 foot	= 0.305 metres
1 mile	= 1.609 kilometres
1 gallon	= 4.546 litres
1 gallon per minute	= 7.576×10^{-2} litres per second

MOE 2241



Map 3126-4

DEPTHS TO WATER-BEARING ZONES IN DEEP OVERBURDEN (Between 50 feet from surface and bedrock)

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

MOE 2242

LEGEND

- Area in which bedrock is less than 50 feet from the surface
- 1 — Area in which most overburden wells obtain water between 51 and 100 feet below ground surface
- 2 — Area in which most overburden wells obtain water between 101 and 150 feet below ground surface
- 3 — Area in which most overburden wells obtain water between 51 and 100 feet and between 101 and 150 feet below ground surface
- 4 — Area in which most overburden wells obtain water between 151 and 200 feet below ground surface
- 5 — Area in which most overburden wells obtain water between 101 and 150 feet and between 151 and 200 feet below ground surface
- 6 — Area in which most overburden wells obtain water between 201 and 250 feet below ground surface
- 7 — Area in which most overburden wells obtain water between 151 and 200 and between 201 and 250 feet
- 8 — Area in which most overburden wells obtain water over 250 feet below ground surface
- 9 — Area in which data are too sparse for interpretation

NOTE:
Base data for this map are indicated on Map 3126-3

DESCRIPTIVE NOTES

In this publication, ground-water availability on a regional scale is indicated in terms of probable quantities of water available, depths at which water is commonly found, and water quality at sampled locations. Because of the complexity of ground-water occurrence, the foregoing information is presented on four map sheets:

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Sheet 2: Supplies in Deep Overburden
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ASSESSING WATER REQUIREMENTS

In order to evaluate well yields, the amount of water required from a prospective well should first be estimated. To estimate the approximate domestic and livestock daily water requirements, multiply the number of users (people and animals) by the appropriate figure in the table below. If desired, an additional 20 to 30% can be added to the total to account for increased demand in the future. While individual residential needs are difficult to estimate, most homes with water-consuming items such as washing machines will average about 100 gallons per day per person.

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each member of the family (kitchen, laundry, bath)	50-150 gallons per day
for each producing milk cow (incl. washing)	35 gallons per day
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for each steer, horse	12 gallons per day
for each hog	4 gallons per day
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for each 100 chickens	6 gallons per day
for each 100 turkeys	12 gallons per day

Note: — table modified from F. R. Hore, Farm Water Supply, Ontario Department of Agriculture and Food, Publication 476

For information on irrigation requirements, contact your Regional Office of the Ontario Ministry of Agriculture and Food.

A COMPARISON OF DIFFERENT WELL TYPES AND THEIR APPLICATIONS

WELL TYPE	SUITABLE GEOLOGIC MATERIALS	ADVANTAGES	DISADVANTAGES
DUG WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Does not require special machinery to construct • Large diameter provides reservoir storage; augments low yields • Can be constructed in areas of limited access	• Labour intensive to construct • Depth is limited because of caving • Well failure is common during dry periods because of usually shallow depths
BORED WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Efficient method of constructing large-diameter wells • Large diameter provides reservoir storage; augments low yields	• Depth is usually limited because of well-drilling equipment limitations and very hard earth materials
DRILLED WELLS	OVERBURDEN AND BEDROCK moderate to high-yielding materials (sand, gravel, sandstone, limestone)	• Can reach deeper depths than other techniques • Can penetrate bedrock	• Generally small-diameter wells with little reservoir storage capacity
DRIVEN OR JETTED WELLS (Sand Points)	OVERBURDEN moderate to high-yielding materials (sand and gravel)	• Simple installation: can be done by hand or machine • A number of these wells can be hooked into one water-supply system	• Small diameter provides little reservoir storage • Depth is limited; depends on tightness of overburden

EVALUATION OF PROSPECTIVE WELL SITES

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To evaluate yields:

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3. refer to the legend and relate the colour to the appropriate probable yield;
4. if the probable yield does not meet your water requirements, repeat steps one through three using Map 3126-3 on Sheet 2 (Yields from Deep Overburden) Similarily, if probable yields determined from Map 3126-2 are insufficient, repeat the same steps using Map 3126-5 on Sheet 3 (Yields from Bedrock).

To evaluate the depths to water-bearing zones:

5. If Map 3126-1 was selected in the above steps, water-bearing zones occur at depths easily reached by shallow dug and bored wells and sand points; if Map 3126-3 was selected, locate the well site on Map 3126-4 and note the depth to the water-bearing zones by using the legend; if Map 3126-6 was selected, locate the well site on Map 3126-6 and note the depths to the water-bearing zones by using the legend;
6. exact depths to water-bearing zones for individual wells are shown on maps 3126-3 and 3126-5.

To evaluate water quality:

7. to evaluate the likely ground-water quality at a potential well site, locate the well on the selected yield map and note the nearby ground-water sampling points. Chemical analyses of these samples are found in the Inorganic Chemical Analyses tables 1, 2, and 3 on Sheet 4. To interpret the significance of the analyses, refer to the "Water Quality" section on Sheet 4.

YIELDS FROM DEEP OVERBURDEN – SUMMARY

Areas where deep overburden wells yield less than two gallons per minute are found mostly along the northern and eastern limits of the mapped area where overburden is not much more than 50 feet thick and does not contain sufficient thicknesses of permeable materials. Yields of 10 to 50 and over 50 gallons per minute generally are found where wells penetrate high-yielding aquifers such as at Barrie in the south and Midland and along the shore of Nottawasaga Bay in the northwest. One such high-yielding aquifer is the Alliston Aquifer Complex which underlies much of the western portion of the map area.

SOURCES OF INFORMATION

Burwasser, G. J., 1974; Quaternary geology of the Collingwood-Nottawasaga area, southern Ontario; Division of Mines, Preliminary Map P.919, Geological Series.

Burwasser, G. J., and Boyd, S. T., 1974; Quaternary geology of the Orr Lake area (western half)—Nottawasaga area (eastern half), southern Ontario; Ontario Division of Mines, Preliminary Map P.975, Geological Series.

Burwasser, G. J., and Cairns, B. D., 1974; Quaternary geology of the Barrie area (western half), southern Ontario; Ontario Division of Mines, Preliminary Map, P.978, Geological Series.

Chapman, L. J., and Putnam, D. F., 1975; Physiography of the Georgian Bay-Ottawa Valley area; Ontario Ministry of Natural Resources, Ontario Research Foundation, Map 2228.

Deane, R. E., 1950; Pleistocene geology of the Lake Simcoe District, Ontario; Geological Survey of Canada, Memoir 256.

Turner, M. E., 1977; The Alliston Aquifer Complex; Ontario Ministry of Environment, Water Resources Branch, Major Aquifers in Ontario Series, Hydrogeologic Map 77-1.

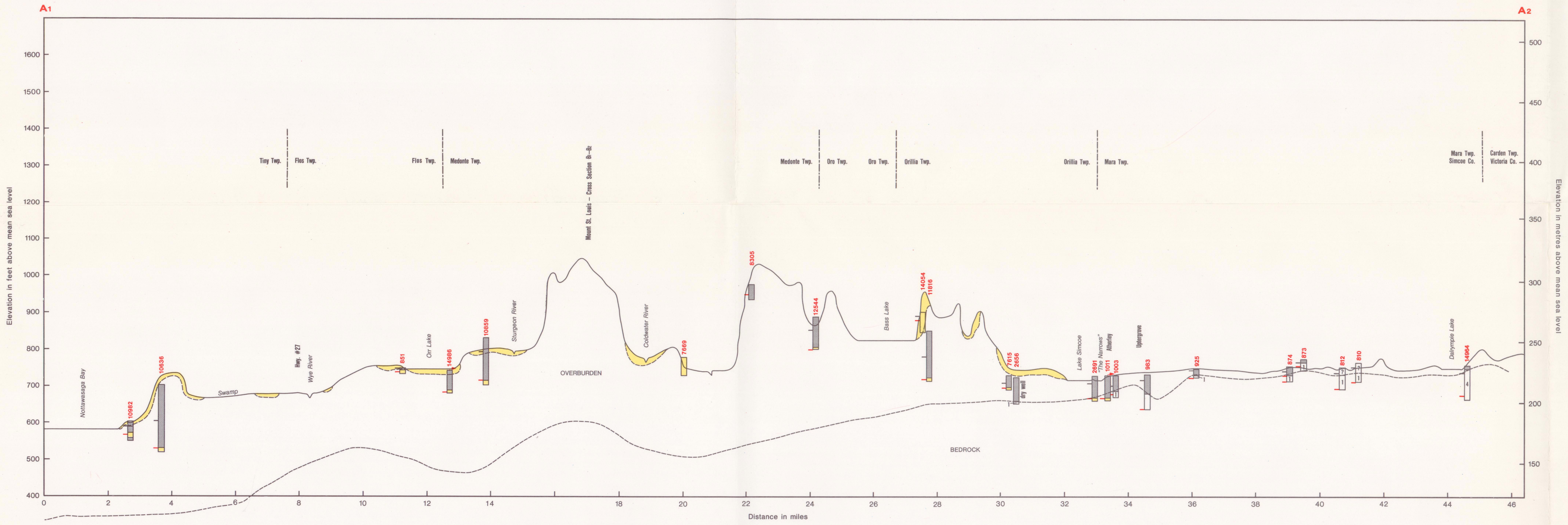
Turner, M. E., 1981; Ground-water probability of the southern portion of the County of Simcoe; Ontario Ministry of Environment, Water Resources Branch, Map 3135.

NOTE:
Geological information was derived from water-well records on file with the Ontario Ministry of Environment up to September, 1979.

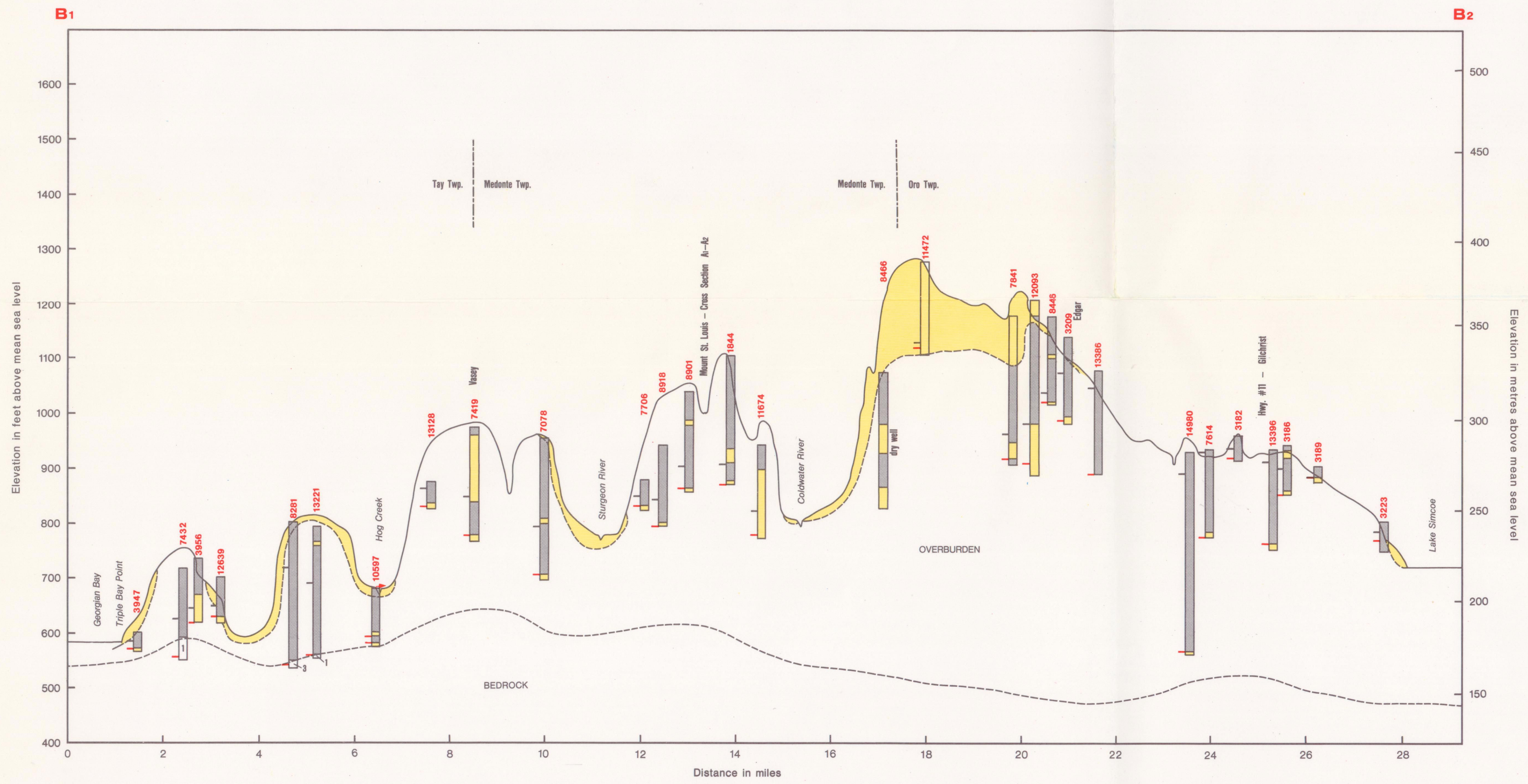
Map compilation and interpretation by M. E. Turner, 1980.

Cartography by D. McQuillan.

Base maps derived from 1:50 000 map sheets of the National Topographic series.



CROSS SECTION A1 - A2



CROSS SECTION B1 - B2

LEGEND FOR CROSS - SECTIONS

- Overburden with high permeability and therefore, good water-yielding capacity from saturated zones; primarily sands and/or gravels; this classification does not infer a homogeneous geological unit but includes sands and gravels of different origins and physical characteristics; some fine sands with good water-yielding capacities are included in this classification; materials, where found at surface, may not be water-bearing
- Overburden with low permeability and therefore, poor water-yielding capacity; clay, silt, very fine sand, clay and stones are included in this classification
- 1 — Limestone
- 2 — Shale
- 3 — Sandstone, Shale
- 4 — Granite
- ? — Material unknown
- Water well
- Location of static water level
- Location of top of water-bearing zone
- Flowing well
- 8305 — Water-well number

Horizontal Scale 1:150 000
Vertical Scale 1:1200

NOTES:

1. Wells shown above or below ground level have been projected onto the line of cross section
2. Locations of cross sections shown on Map 3126 – 3

Ontario
MINISTRY OF THE ENVIRONMENT
Water Resources Branch

COUNTY OF SIMCOE (Northern Portion)

Map 3126

GROUND-WATER PROBABILITY

SHEET 2

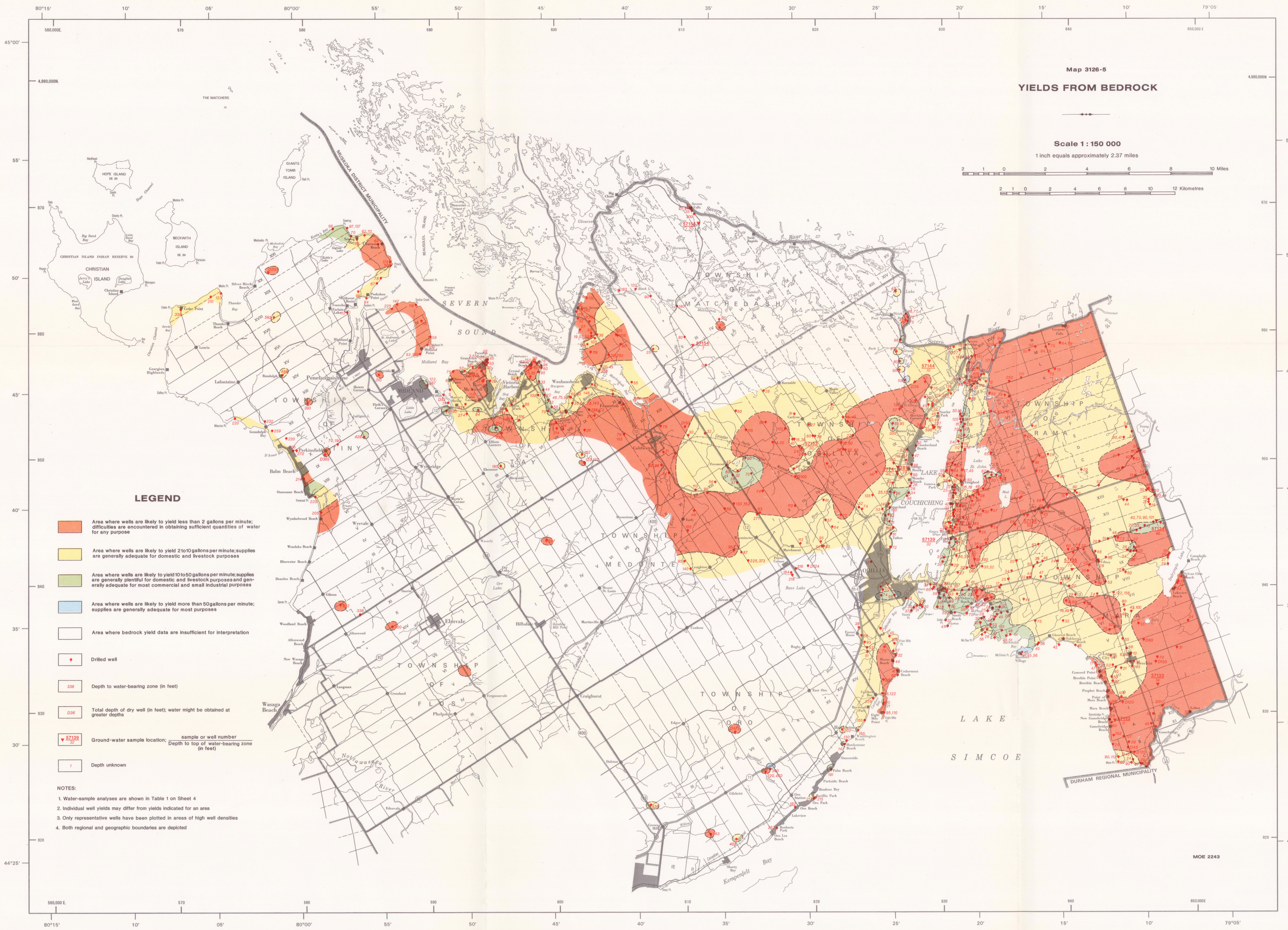
WATER SUPPLIES IN DEEP OVERBURDEN

Map 3126-5

YIELDS FROM BEDROCK

Scale 1 : 150 000

1 inch equals approximately 2.37 miles



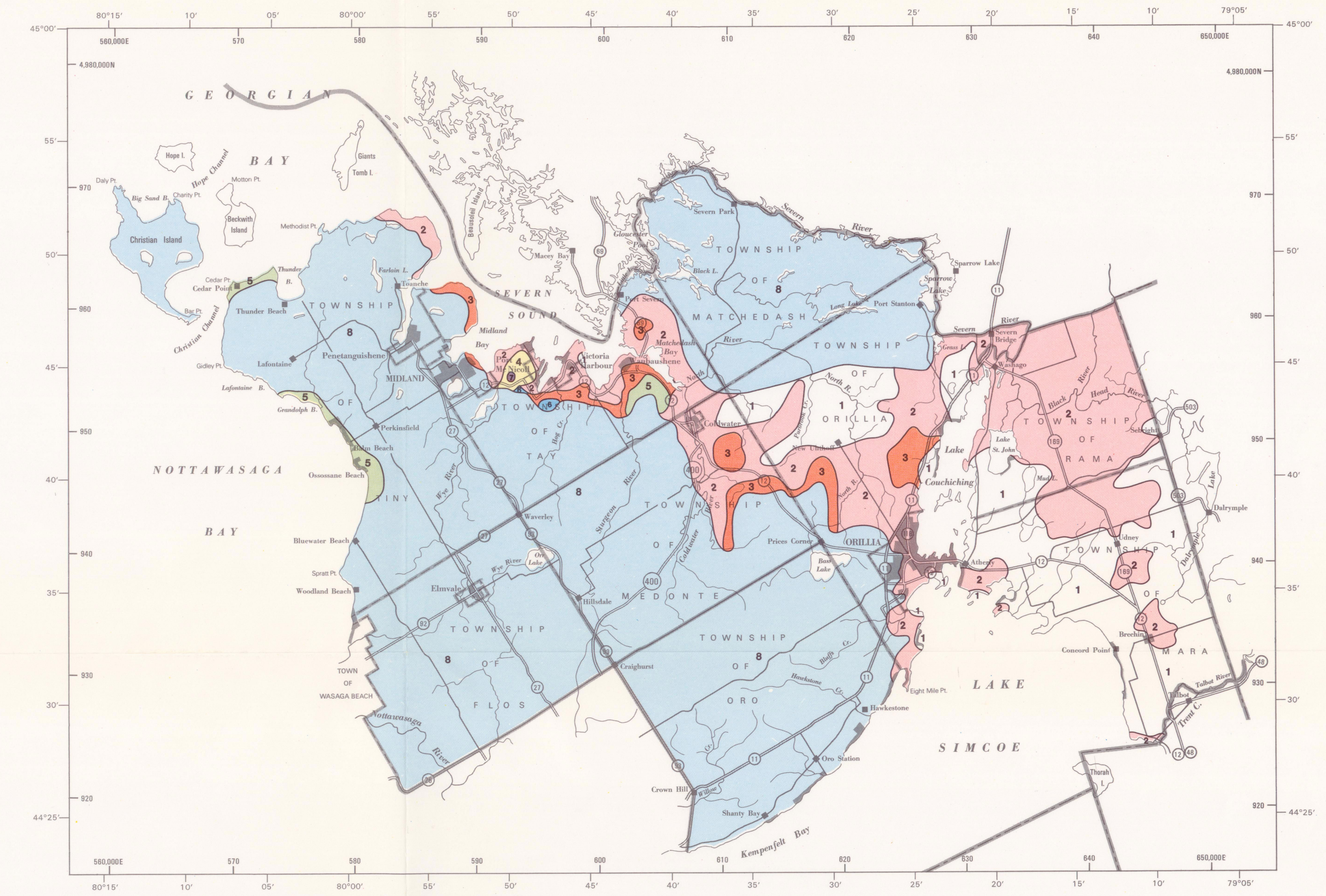
LEGEND

- Area where wells are likely to yield less than 2 gallons per minute; difficulties are encountered in obtaining sufficient quantities of water for any purpose
- Area where wells are likely to yield 2 to 10 gallons per minute; supplies are generally adequate for domestic and livestock purposes
- Area where wells are likely to yield 10 to 50 gallons per minute; supplies are generally plentiful for domestic and livestock purposes and generally adequate for most commercial and small industrial purposes
- Area where wells are likely to yield more than 50 gallons per minute; supplies are generally adequate for most purposes
- Area where bedrock yield data are insufficient for interpretation
- Drilled well
- 338 — Depth to water-bearing zone (in feet)
- D36 — Total depth of dry well (in feet); water might be obtained at greater depths
- 57139 / 32 — Ground-water sample location; sample or well number / Depth to top of water-bearing zone (in feet)
- ? — Depth unknown

NOTES:

1. Water-sample analyses are shown in Table 1 on Sheet 4
2. Individual well yields may differ from yields indicated for an area
3. Only representative wells have been plotted in areas of high well densities
4. Both regional and geographic boundaries are depicted

MOE 2243



Map 3126-6

DEPTHS TO WATER-BEARING ZONES IN BEDROCK

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

LEGEND

1. Area in which most bedrock wells obtain water between 0 and 50 feet below ground surface
2. Area in which most bedrock wells obtain water between 51 and 100 feet below ground surface
3. Area in which most bedrock wells obtain water between 101 and 150 feet below ground surface
4. Area in which most bedrock wells obtain water between 151 and 200 feet below ground surface
5. Area in which most bedrock wells obtain water between 201 and 250 feet below ground surface
6. Area in which most bedrock wells obtain water between 251 300 feet below ground surface
7. Area in which most bedrock wells obtain water between 301 and 350 feet below ground surface
8. Area in which data are too sparse for interpretation. See "Probable Yields Map" (map 3126-5) for depths to water-bearing zones of individual wells

NOTE:
Base data for this map are indicated on Map 3126–5

MOE 2244

METRIC CONVERSIONS

1 foot = 0.305 metres

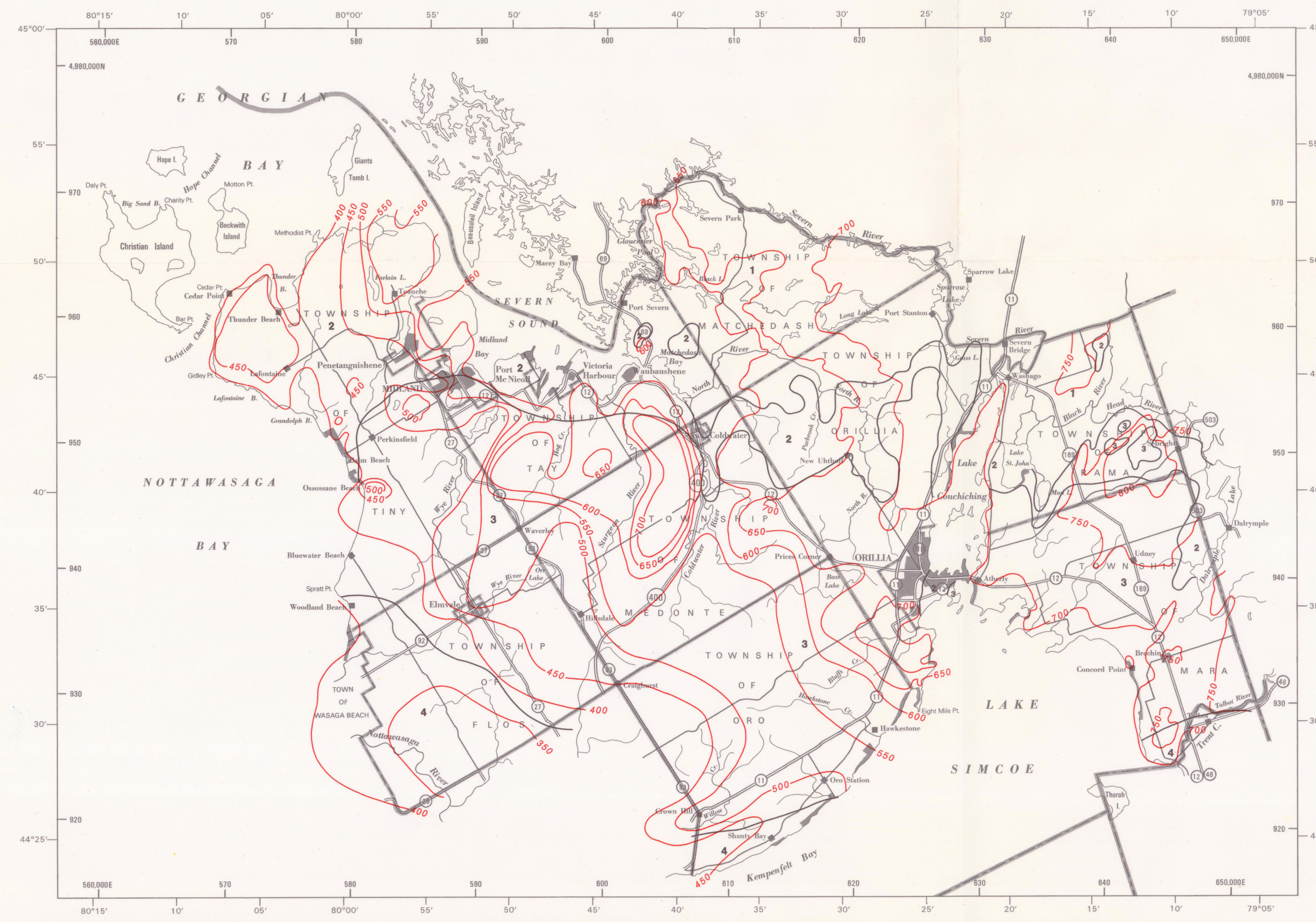
1 mile = 1.609 kilometres

1 gallon = 4.546 litres

1 gallon per minute = 7.576×10^{-2} litres per second

Gallons per minute	0	5	10	15	20	25	30	35	40	45	50

Litres per second	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0



Map 3126-7

BEDROCK LITHOLOGY AND TOPOGRAPHY

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

LEGEND

PALEOZOIC

ORDOVICIAN

- 4 — Limestone, shale, interbedded : Verulam Formation
- 3 — Limestone, brown, grey : Bobcaygeon Formation
- 2 — Limestone, lithographic : Gull River Formation; Shale, red, green : Shadow Lake Formation

PRECAMBRIAN

- 1 — Granite gneiss, red; minor grey crystalline limestone

- 450 — Bedrock surface elevation, contour interval 50 feet (all elevations in feet above mean sea level)

NOTES:

1. Bedrock geology after Liberty (1969)
2. Location of bedrock topography control points are shown on Map 3126–5

MOE 2245

DESCRIPTIVE NOTES

In this publication, ground-water availability on a regional scale is indicated in terms of probable quantities of water available, depths at which water is commonly found, and water quality at sampled locations. Because of the complexity of ground-water occurrence, the foregoing information is presented on four map sheets:

Sheet 1: Supplies in Shallow Overburden
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Sheet 3: Supplies in Bedrock
Sheet 4: Water Quality

Hydrogeologic interpretations are based on data obtained from approximately 8,000 water-well records on file with the Ontario Ministry of the Environment and from past-documented studies of ground-water availability. The appropriate references are listed on each map sheet. Reliability of the interpretations varies throughout the region and a periodic up-dating or revision of the present interpretations may be necessary as new hydrogeologic information becomes available.

It is important to note that the interpreted probable well yields may not everywhere represent yields available to all wells because of variations in local hydrogeology, type of well construction, and in the reliability of available data. However, the indicated yields are thought to be good approximations in most areas. In cases where reliable, long-term yields are sought, it is necessary to undertake detailed hydrogeologic investigations and pumping tests.

ASSESSING WATER REQUIREMENTS

In order to evaluate well yields, the amount of water required from a prospective well should first be estimated. To estimate the approximate domestic and livestock daily water requirements, multiply the number of users (people and animals) by the appropriate figure in the table below. If desired, an additional 20 to 30% can be added to the total to account for increased demand in the future. While individual residential needs are difficult to estimate, most homes with water-consuming items such as washing machines will average about 100 gallons per day per person.

It is important to take into account the water demand during peak periods of usage in order that the well does not run dry temporarily. This demand can be estimated by counting the number of fixtures and water outlets in the house which will be used at one time, and multiplying by the flow rate for each. Tables showing the flow rate per fixture can be obtained from water-supply equipment dealers.

Approximate Daily Water Requirements

each member of the family (kitchen, laundry, bath)	50-150 gallons per day
for each producing milk cow (incl. washing)	35 gallons per day
for each dry cow	15 gallons per day
for each steer, horse	12 gallons per day
for each hog	4 gallons per day
for each sheep	2 gallons per day
for each 100 chickens	6 gallons per day
for each 100 turkeys	12 gallons per day

Note: — table modified from F. R. Hore, Farm Water Supply, Ontario Department of Agriculture and Food, Publication 476

For information on irrigation requirements, contact your Regional Office of the Ontario Ministry of Agriculture and Food.

EVALUATION OF PROSPECTIVE WELL SITES

By using the maps in this publication along with the following step-by-step procedure, prospective well sites can be evaluated in terms of probable yields, likely depths to water-bearing zones, and likely quality of water at each site. Subsequently, this information can be used in other considerations such as: possible water treatment, pump type and size, well cost, and type of well construction (a table illustrating the different types of well construction and their applications is appended).

The maps should be used in the suggested sequence in order to obtain the most economic wells. Map 3126-1 indicates yields from the shallowest formations and should be consulted first. Progressively deeper and more costly wells will have to be constructed as water is sought from deeper formations in order to obtain the yields indicated on maps 3126-3 and 3126-5.

Evaluation Procedure

1. locate the well site on Map 3126-1 of Sheet 1 (Yields from Shallow Overburden);
2. note the colour of the map at the well site;
3. refer to the legend and relate the colour to the appropriate probable yield;
4. if the probable yield does not meet your water requirements, repeat steps one through three using Map 3126-3 on Sheet 2 (Yields from Deep Overburden). Similarily, if probable yields determined from Map 3126-3 are insufficient, repeat the same steps using Map 3126-5 on Sheet 3 (Yields from Bedrock).

To evaluate the depths to water-bearing zones:

5. If Map 3126-1 was selected in the above steps, water-bearing zones occur at depths easily reached by shallow dug and bored wells and sand points; if Map 3126-3 was selected, locate the well site on Map 3126-4 and note the depth to the water-bearing zones by using the legend; if Map 3126-5 was selected, locate the well site on Map 3126-6 and note the depths to the water-bearing zones by using the legend;
6. exact depths to water-bearing zones for individual wells are shown on maps 3126-1, 3126-3 and 3126-5.

To evaluate water quality:

7. to evaluate the likely ground-water quality at a potential well site, locate the well on the selected yield map and note the nearby ground-water sampling points. Chemical analyses of these samples are found in the Inorganic Chemical Analyses (tables 1, 2, and 3) on Sheet 4. To interpret the significance of the analyses, refer to the "Water Quality" section on Sheet 4.

A COMPARISON OF DIFFERENT WELL TYPES AND THEIR APPLICATIONS

WELL TYPE	SUITABLE GEOLOGIC MATERIALS	ADVANTAGES	DISADVANTAGES
DUG WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Does not require special machinery to construct • Large diameter provides reservoir storage; augments low yields • Can be constructed in areas of limited access	• Labour intensive to construct • Depth is limited because of caving • Well failure is common during dry periods because of usually shallow depths
BORED WELLS	OVERBURDEN both low- and high-yielding materials (gravel, sand, silt, clay)	• Efficient method of constructing large-diameter wells • Large diameter provides reservoir storage; augments low yields	• Depth is usually limited because of well-drilling equipment limitations and very hard earth materials
DRILLED WELLS	OVERBURDEN AND BEDROCK moderate to high-yielding materials (sand, gravel, sandstone, limestone)	• Can reach deeper depths than other techniques • Can penetrate bedrock	• Generally small-diameter wells with little reservoir storage capacity
DRIVEN OR JETTED WELLS (Sand Points)	OVERBURDEN moderate to high-yielding materials (sand and gravel)	• Simple installation: can be done by hand or machine • A number of these wells can be hooked into one water-supply system	• Small diameter provides little reservoir storage • Depth is limited; depends on tightness of overburden

YIELDS FROM BEDROCK – SUMMARY

Most wells in bedrock yield less than 2 or between 2 and 10 gallons per minute. These wells penetrate limestones and shales of the Gull River and Shadow Lake formations or, in the northeast portion of the map area, Precambrian age granite-gneisses of the Canadian Shield. Areas with higher yields of 10 to 50 and more than 50 gallons per minute are found along the shores of lakes Simcoe and Couchiching and Sturgeon and Georgian Bays in the northwestern portion of the map area. In most cases, these higher-yielding wells produce water from fractured bedrock and pumping induces infiltration from the adjacent bodies of water. One area of wells yielding 10 to 50 gallons per minute in the central portion of the map area does not lie adjacent to any significant body of water. Wells in this area probably are completed in highly-fractured bedrock.

Much of the map area to the south and west, and in Matchedash Township in the north-central portion of the map area, have too few wells for interpretation of probable yields to bedrock wells. In these areas probable yields of individual wells are marked on the map. In the area to the south and west, adequate water supplies likely can be obtained from the overburden.

NOTE:
Bedrock-surface elevations derived from water-well records on file with the Ontario Ministry of Environment up to September, 1979.

Bedrock topography compilation and interpretation by M. E. Turner, 1980.

Cartography by D. McQuillan.

Base maps derived from 1:50 000 map sheets of the National Topographic series.

SOURCES OF INFORMATION

Burwasser, G. J., and Ford, M. J., 1974; Bedrock topography of the Orr Lake area, southern Ontario; Ontario Division of Mines, Preliminary Map P.978, Bedrock Topography Series.

————————, 1974; Bedrock topography of the Barrie area, southern Ontario; Ontario Division of Mines, Preliminary Map P.979, Bedrock Topography Series.

Deane, R. E., 1950; Pleistocene geology of the Lake Simcoe District, Ontario; Geological Survey of Canada, Memoir 256.

Liberty, B. A., 1969; Palaeozoic geology of the Lake Simcoe area, Ontario; Geological Survey of Canada, Memoir 355.

Telford, P. G., 1975; Paleozoic geology of the Collingwood-Nottawasaga area, southern Ontario; Ontario Division of Mines, Map 2341.

Turner, M. E., 1981; Ground-water probability of the southern portion of the County of Simcoe; Ontario Ministry of Environment, Water Resources Branch, Map 3135.

Ontario
MINISTRY OF THE ENVIRONMENT
Water Resources Branch

COUNTY OF SIMCOE (Northern Portion)

Map 3126

GROUND-WATER PROBABILITY

SHEET 3

WATER SUPPLIES IN BEDROCK

INORGANIC CHEMICAL ANALYSES OF GROUND - WATER SAMPLES

Table 1. Inorganic Chemical Analyses - Shallow Overburden Wells

(sample locations shown on Map 3126–1)

Sample Number	Sampling Date	pH in Lab	Constituents in milligrams per litre (mg/L)										Total Alkalinity as mg/L (CaCO3)	Total Hardness as mg/L (CaCO3)	Total Dissolved Solids (mg/L)	Specific Conductance in Lab (μ mho/cm at 25° C)
			Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (CaCO3)	Sulphate (SO4)	Chloride (Cl)	Fluoride (F)	Nitr. + Nitr. (N)				
8025	24/06/80	7.6	0.11	90	17	4	1.7	248	18	7	0.1	5.3	248	297	360	535
57102	23/06/80	7.7	.06	75	5	4	5.9	183	23	2	<0.1	1.8	183	208	255	394
57106	23/06/80	7.4	.19	120	17	5	4.3	192	36	84	<0.1	58	192	369	590	720
57108	23/06/80	7.6	.09	65	3	2	1.4	77	19	2	<0.1	22	77	176	235	365
57109	23/06/80	7.4	.24	133	12	19	7.6	291	41	28	0.1	13	291	382	545	762
57113	23/06/80	7.5	.27	75	2	2	0.8	167	16	7	<0.1	<0.1	167	195	230	356
57115	23/06/80	7.5	.48	54	6	2	6.6	142	15	2	<0.1	0.7	142	157	200	304
57117	23/06/80	7.3	.05	146	23	13	3.3	380	32	38	<0.1	1.5	380	458	560	840
57118	23/06/80	7.1	.15	141	15	11	132	362	55	24	<0.1	36	362	412	800	1140
57120	23/06/80	7.5	.13	120	5	5	1.5	292	19	7	<0.1	0.4	292	321	375	575
57125	24/06/80	7.4	.03	128	6	7	4.1	287	31	8	<0.1	4.6	287	343	450	622
57126	24/06/80	7.6	.03	87	9	5	1.2	160	16	19	<0.1	14	160	253	400	485
57129	24/06/80	7.3	.05	120	11	3	3.7	316	18	2	<0.1	1.0	316	346	390	600
57131	26/06/80	7.7	<.01	118	18	13	1.9	275	45	35	0.1	2.3	275	367	450	683
57136	26/06/80	7.6	.04	126	42	138	3.1	265	158	225	<0.1	3.1	265	490	940	1420
57137	26/06/80	7.3	.50	35	1	23	2.4	83	19	15	<0.1	4.1	83	92	180	275
57140	26/06/80	6.7	.36	24	5	6	5.1	14	21	10	<0.1	13	14	79	145	221
57141	26/06/80	7.1	.02	126	40	6	1.3	356	22	61	<0.1	1.6	356	479	600	818
57142	26/06/80	6.8	.36	19	2	2	2.7	26	12	14	<0.1	1.3	26	57	98	150
57143	26/06/80	6.4	.04	32	4	6	7.0	37	19	6	<0.1	15	37	98	165	256
57145	26/06/80	7.2	.01	116	10	3	2.9	295	13	3	<0.1	4.3	295	332	380	580
57146	26/06/80	7.5	.16	103	14	9	2.4	276	28	13	0.3	0.3	276	314	370	578
57147	26/06/80	7.3	.79	87	10	11	3.1	225	22	27	0.2	0.2	225	257	355	530
57148	26/06/80	8.1	.33	29	1	3	2.4	59	10	3	<0.1	2.8	59	76	110	166
57149	26/06/80	7.5	.04	88	6	8	2.7	144	20	62	<0.1	1.8	144	246	450	515
57151	26/06/80	7.7	.03	76	22	9	2.4	217	37	17	<0.1	2.9	217	280	375	532

Table 2. Inorganic Chemical Analyses - Deep Overburden Wells

(sample locations shown on Map 3126–3)

Sample Number	Sampling Date	pH in Lab	Constituents in milligrams per litre (mg/L)										Total Alkalinity as mg/L (CaCO3)	Total Hardness as mg/L (CaCO3)	Total Dissolved Solids (mg/L)	Specific Conductance in Lab (μ mho/cm at 25° C)
			Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (CaCO3)	Sulphate (SO4)	Chloride (Cl)	Fluoride (F)	Nitr. + Nitr. (N)				
443	27/07/59	8.0	0.28	–	–	–	–	–	–	3	–	–	159	151	–	–
805	23/06/80	7.6	0.67	71	6	4	10	188	15	<1	0.1	<0.1	188	201	235	363
1075	24/06/80	8.0	0.24	49	9	3	1.7	147	11	<1	<0.1	0.2	147	159	190	291
1892	25/03/64	8.0	0.13	–	–	–	–	–	19	13	–	0.6	194	250	300	–
3448	18/05/66	–	–	65	17	–	–	268	20	10	0.1	0.15	156	162	–	–
3888	18/07/63	7.9	0.2	–	–	–	–	–	26	8	–	2.0	178	190	–	–
3978	23/06/80	7.7	0.06	76	14	4	2.3	227	17	<1	0.1	1.0	227	246	285	436
4476	18/07/63	7.9	0.25	–	–	–	–	–	16	5	–	–	174	166	–	–
4479	18/07/63	7.5	0.12	–	–	–	–	–	24	9	–	1.5	242	248	–	–
4503	18/07/63	8.2	0.15	–	–	–	–	–	–	10	2	0.10	120	122	–	–
4505	30/06/64	8.1	–	–	–	–	–	–	10	2	0.1	0.15	156	162	–	–
6384	23/06/80	7.6	0.02	65	17	4	2.0	193	16	2	0.1	5.7	193	231	275	420
57101	23/06/80	7.9	0.34	46	15	7	1.7	177	10	<1	0.1	<0.1	177	177	215	328
57103	23/06/80	7.7	0.10	61	12	3	2.6	177	25	1	0.1	0.3	177	203	235	364
57105	23/06/80	7.6	0.33	141	22	25	4.3	332	60	39	0.1	11	332	444	700	868
57107	23/06/80	8.1	0.11	43	4	2	1.2	107	12	<1	<0.1	0.3	107	120	150	228
57110	23/06/80	7.8	0.13	59	15	5	2.3	157	30	10	0.1	4.0	157	211	265	405
57111	23/06/80	7.9	0.07	50	7	3	2.5	118	22	4	<0.1	4.1	118	156	200	308
57112	23/06/80	8.0	0.10	40	7	2	1.5	114	15	<1	<0.1	0.1	114	128	160	244
57114	23/06/80	8.1	0.10	39	4	1	0.8	99	11	<1	<0.1	0.3	99	112	135	210
57116	23/06/80	8.2	0.03	38	3	4	1.6	78	14	2	0.1	5.4	78	110	150	227
57122	24/06/80	7.7	0.07	76	4	2	1.3	185	13	<1	<0.1	1.3	185	207	240	368
57127	24/06/80	7.8	0.21	54	17	10	1.8	181	23	12	0.1	<0.1	181	207	265	405
57128	24/06/80	7.8	0.02	78	8	1	0.8	201	13	2	<0.1	1.4	201	226	255	396
57130	24/06/80	7.8	0.16	61	14	3	1.1	174	19	2	0.1	3.5	174	209	245	378
57150	24/06/80	7.6	0.07	109	6	7	1.6	255	15	10	<0.1	5.4	255	298	370	545
57152	27/06/80	7.6	0.17	<1	<1	185	1.9	300	31	14	<0.1	12	300	3	490	735

Table 3. Inorganic Chemical Analyses - Bedrock Wells

(sample locations shown on Map 3126–5)

Sample Number	Sampling Date	pH in Lab	Constituents in milligrams per litre (mg/L)										Total Alkalinity as mg/L (CaCO3)	Total Hardness as mg/L (CaCO3)	Total Dissolved Solids (mg/L)	Specific Conductance in Lab (μ mho/cm at 25° C)
			Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (CaCO3)	Sulphate (SO4)	Chloride (Cl)	Fluoride (F)	Nitr. + Nitr. (N)				
2774	01/71	7.4	0.15	–	–	–	–	–	–	189	–	1.2	248	304	390	–
2818	09/71	7.2	0.10	–	–	–	–	–	–	249	–	4.0	270	440	820	–
3958	18/07/63	7.9	0.18	–	–	–	–	–	635	149	1.6	0.3	236	550	–	–
5366	26/06/80	8.0	0.12	369	29	1090	8.8	51	1950	847	1.7	<0.1	51	1040	4530	5550
13843	27/06/80	7.4	3.0	116	17	6	2.0	276	63	10	<0.1	<0.1	276	358	440	620
57132	26/06/80	7.5	0.24	161	9	5	2.7	246	57	21	<0.1	28	246	440	670	810
57133	26/06/80	7.6	0.40	127	1	4	12.4	234	40	16	<0.1	8.5	234	321	435	610
57134	26/06/80	7.7	0.05	83	12	17	1.5	189	45	23	0.1	3.9	189	257	380	525
57135	26/06/80	7.0	0.04	197	14	23	3.2	359	130	43	<0.1	6.2	359	550	625	1005
57139	26/06/80	7.2	0.06	134	11	13	25	296	78	27	0.2	1.7	296	378	525	763
57144	26/06/80	6.5	0.60	31	6	5	1.9	48	14	31	<0.1	1.7	48	101	155	240

DESCRIPTIVE NOTES

The inorganic chemical quality of ground water at locations in the study area can be estimated by inspecting the analyses of nearby ground-water samples. Analyses of the samples are shown in tables 1, 2 and 3; locations of the samples are shown on maps 3126-1, 3126-3 and 3126-5. Samples were taken from selected overburden and bedrock wells and indicate quality of ground water in the common water-bearing zones in different parts of the study area.

The following table summarizes water-quality criteria from the publication: "Water Management—Goals, Policies, Objectives, and Implementation Procedures of the Ministry of the Environment, 1978". These criteria are maximum concentrations recommended for drinking water supplies and for agricultural uses. While the criteria should generally be adhered to, slight excesses are usually not harmful. In cases where quality of the water supply is in doubt, local health authorities should be consulted.

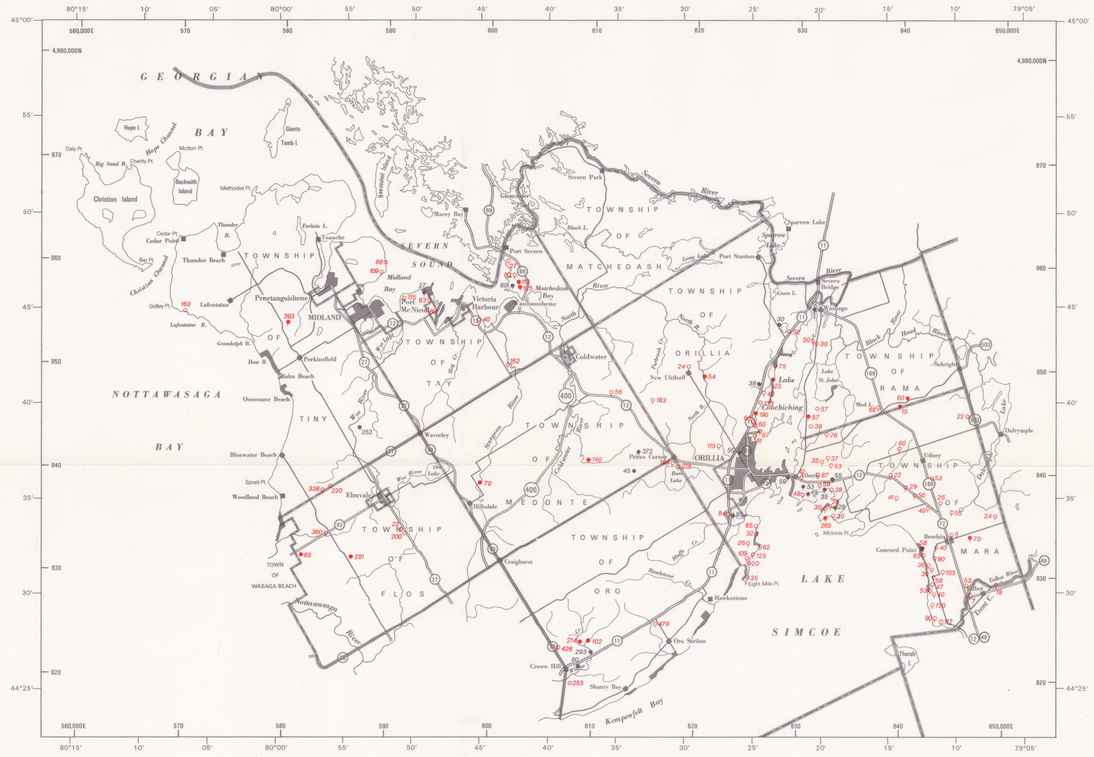
WATER QUALITY-SUMMARY

Of the wells sampled in the northern portion of the County of Simcoe, 2 per cent have salty water (chloride content over 250 mg/L), 19 per cent have high concentration of nitrates (NO_2+NO_3 over 10 mg/L), 23 per cent have high concentrations of iron (over 0.3 mg/L), and 19 per cent have very hard water (over 400 mg/L $CaCO_3$). Of those wells with high concentrations of nitrate, 70 per cent were in shallow overburden and probably suffer contamination from surface-water runoff. Most sulphurous, salty and mineralized water wells are those drilled into bedrock as in the eastern portion of the map area around Orillia and Lakes Simcoe and Couchiching. A few overburden wells more than 200 feet deep also yield poor quality water as in the south-central (northeast of Barrie) and southwestern (Flos and Tiny townships) portions of the map area.

Table 4. Water Quality Parameters

Substance	Significance	Drinking Water Quality Criteria	Agricultural Water Quality Criteria
Iron	Iron in excessive concentrations will precipitate after exposure to air, which causes turbidity, stains plumbing fixtures, laundry and cooking utensils, and imparts objectionable tastes and colours to foods and drinks.	0.3 mg/L*	not specified
Hardness (Calcium, Magnesium)	Consumes soap before a lather will form. Hard water forms scale in water heaters and pipes. Waters of hardness greater than 180 mg/L are classified as very hard.	not specified	not specified
Sodium Potassium	Large amounts in combination with chloride give a salty taste. Moderate quantities have little effect on the usefulness of water for most purposes. A high sodium content may limit the use of water for irrigation and in some instances for domestic consumptive uses.	not specified	not specified
Sulphate	In large amounts, sulphate can have laxative effects on unaccustomed users and in combination with other ions, gives a bitter taste to water.	250 mg/L	not specified
Chloride	In large amounts and in combination with sodium, chloride gives water a salty taste and increases the corrosiveness of water.	250 mg/L	not specified
Fluoride	In large amounts, fluoride can disfigure teeth by mottling the enamel. However, in more desirable amounts (1.0 mg/L), fluoride has been found to inhibit tooth decay.	2.4 mg/L	2.0 mg/L
Nitrate	Concentration much greater than the natural regional background may suggest pollution. Waters of high nitrate content cause methemoglobinemia (an often fatal infant disease) and therefore should not be used in infant feeding. Nitrate encourages the growth of algae and other organisms that produce undesirable tastes and odours.	10 mg/L (as N)	100 mg/L**
Dissolved Solids	High dissolved solids may often suggest that criteria of one or more substances have been exceeded.	500 mg/L	3000 mg/L

*mg/L = milligrams of substance per litre of water
**nitrate + nitrite



Map 3126–8

WATER QUALITY

Scale 1 : 300 000

1 inch equals approximately 4.73 miles

5 0 5 10 Miles

5 0 5 10 15 Kilometres

LEGEND

- ● 214 — Overburden well with reported salty water; depth to salty water-bearing zone shown in feet
- ○ 163 — Overburden well with reported sulphurous water; depth to sulphurous water-bearing zone shown in feet
- ● 253 — Overburden well with reported mineralized water; depth to mineralized water-bearing zone shown in feet
- ● 393 — Bedrock well with reported salty water; depth to salty water-bearing zone shown in feet
- ○ 338 — Bedrock well with reported sulphurous water; depth to sulphurous water-bearing zone shown in feet
- ● 373 — Bedrock well with reported mineralized water; depth to mineralized water-bearing zone shown in feet

NOTE:
"Sulphurous" water usually denotes the presence of hydrogen sulphide gas; a high concentration of sulphate (SO_4) may also be present

SOURCES OF INFORMATION

Map compilation by M. E. Turner

Cartography by D. McQuillan

Geologic information was derived from water-well records on file with the Ontario Ministry of the Environment up to September, 1979

Base map was derived from 1:25 000 and 1:50 000 sheets of the National Topographic series

METRIC CONVERSIONS

1 foot	=	0.305 metres
1 mile	=	1.609 kilometres
1 gallon	=	4.546 litres
1 gallon per minute	=	7.576×10^{-2} litres per second

MOE 2242

Ontario
MINISTRY OF THE ENVIRONMENT
Water Resources Branch

COUNTY OF SIMCOE (Northern Portion)

Map 3126

GROUND-WATER PROBABILITY

SHEET 4

GROUND-WATER QUALITY

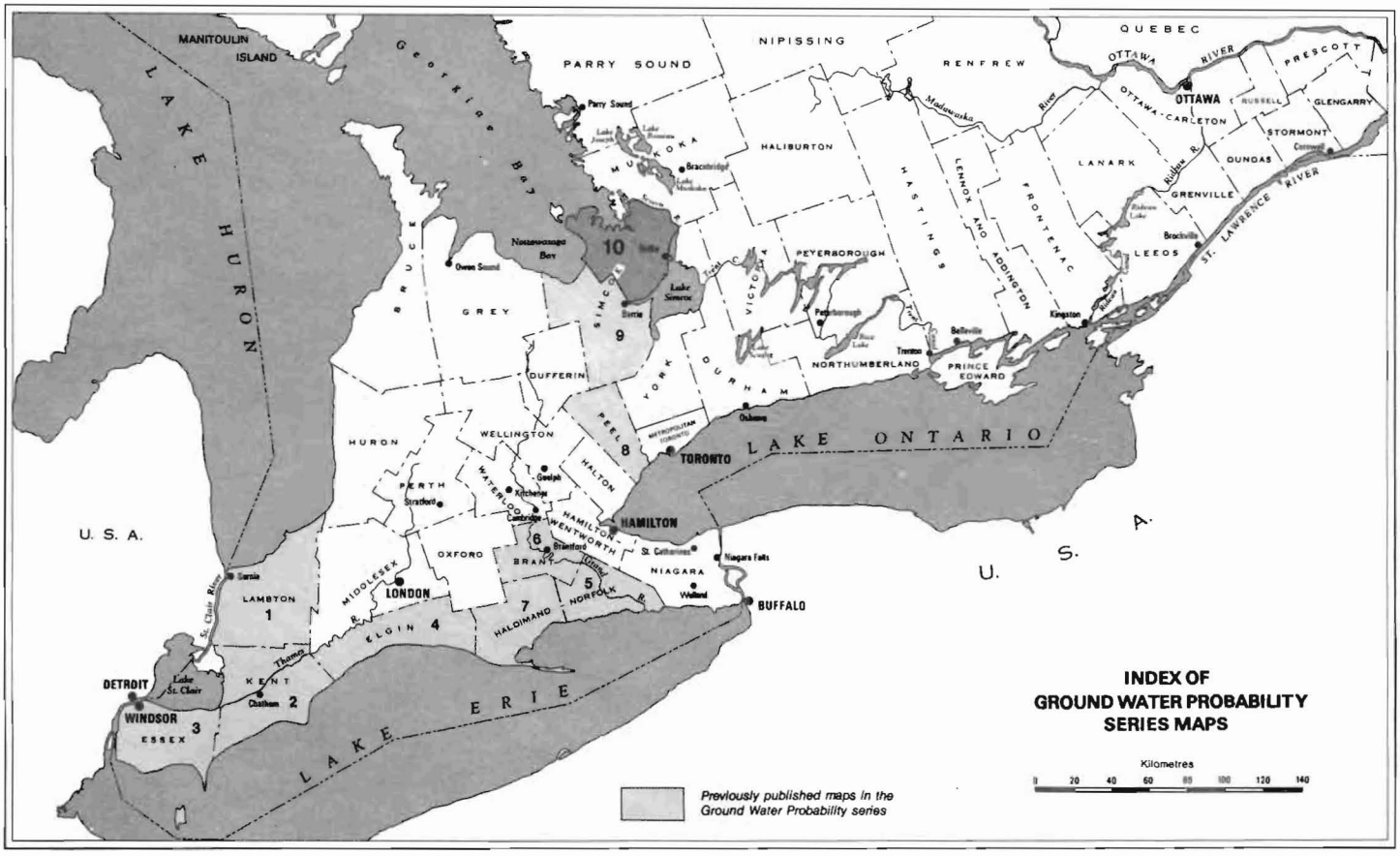
Water Resources Map 3126 - County of Simcoe (Northern Portion)

Sheet 1 . **Water Supplies in Shallow Overburden**
(Within 50 feet of surface)
Map 3126-1. Yields from Shallow Overburden
Map 3126-2. Permeability of Surficial Materials
Descriptive Notes: Assessing Water Requirements
Evaluation of Prospective Well Sites
A Comparison of Different Well Types and their Applications
Summary

Sheet 2 . **Water Supplies in Deep Overburden**
(Between 50 feet from surface and bedrock)
Map 3126-3. Yields from Deep Overburden
Map 3126-4. Depths to Water-Bearing Zones in Deep Overburden
Cross Section $A_1 - A_2$
Cross Section $B_1 - B_2$
Descriptive Notes *(similar to Sheet 1)*

Sheet 3 . **Water Supplies in Bedrock**
Map 3126-5. Yields from Bedrock
Map 3126-6. Depths to Water-Bearing Zones in Bedrock
Map 3126-7. Bedrock Lithology and Topography
Descriptive Notes *(similar to Sheets 1 and 2)*

Sheet 4 . **Ground - Water Quality**
Map 3126. Water Quality
Table 1. Inorganic Chemical Analyses – Shallow Overburden Wells
Table 2. Inorganic Chemical Analyses – Deep Overburden Wells
Table 3. Inorganic Chemical Analyses – Bedrock Wells
Table 4. Water Quality Parameters
Summary



GROUND WATER PROBABILITY SERIES

1	*Map 3118-1	County of Lambton	1969
2	*Map 3117-1	County of Kent	1970
3	*Map 3107-1	County of Essex	1971
4	*Map 3106	County of Elgin	1972
5	*Map 3112	County of Haldimand	1974
6	*Map 3100	County of Brant	1977
7	Map 3124	Region of Haldimand/Norfolk (Western Portion)	1978
8	Map 3128	Region of Peel	1979
9	Map 3135	County of Simcoe (Southern Portion)	1981
10	**Map 3126**	**County of Simcoe (Northern Portion)**	**1982**

*out of print